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<p>This manual provides design information for four groups of sediment control structures and treatments which are suitable for use on small areas in surface coal mining. A detailed design procedure is given for each group which will estimate the total amount of settleable solids from a small area with a sediment control structure or treatment for a specific design storm. A procedure is also given for estimating the mean annual sediment yield from a small area. Information on design, installation, maintenance and cost is given for each sediment control measure. Methods for determining the maximum allowable area for each sediment control measure and for design of combined sediment control systems are presented. The design procedures contain numerous nomographs, graphs, and worksheets to facilitate the use of the design procedure. The sediment control measures, design procedures, and materials in this manual are applicable to coal bearing regions of the continental United States.</p>			
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***DESIGN of SEDIMENT CONTROL MEASURES  
for SMALL AREAS in  
SURFACE COAL MINING***

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*by*

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## LIST OF SYMBOLS

A . . . . .	Area
$A_b$ . . . . .	Bare soil area, acres
$A_{maxd}$ . . . . .	Maximum area for the diversion and conveyance, acre
$A_{maxs}$ . . . . .	Maximum area above the structure, acres
$A_{maxt}$ . . . . .	Maximum area for treatments, acre
b . . . . .	Rainfall ratio exponent
C . . . . .	Constant
$C_f$ . . . . .	Structure length coefficient
$C_g$ . . . . .	Decimal percent cover
$C_l$ . . . . .	Overland flow length coefficient
$C_r$ . . . . .	Mean annual sediment yield factor
$C_{rT}$ . . . . .	Total mean annual sediment yield factor
$C_s$ . . . . .	Mean concentration of settleable solids, ppm
$C_w$ . . . . .	Settling parameter
CN . . . . .	Curve number
$CN_H$ . . . . .	High value of CN in the given range
$CN_L$ . . . . .	Low value of CN in the given range
d . . . . .	depth, feet
$d_c$ . . . . .	design depth, feet
$d_d$ . . . . .	deposition depth, feet
$d_f$ . . . . .	additional freeboard exceeding 5 feet
$d_h$ . . . . .	hydraulic depth, feet
$d_{max}$ . . . . .	maximum allowable ponded depth for the structure, feet
$d_{sw}$ . . . . .	ponded depth of water and sediment, feet
$D_c$ . . . . .	critical particle size, mm

LIST OF SYMBOLS (continued)

$D_f$	Overland flow detachment coefficient
$D_s$	Particle size distribution, inches
$e_s$	Trap efficiency
FE	Filtering efficiency, %
$g_t$	Sediment transport rate, tons/foot/hour
$G_d$	Sediment trapped, tons
$G_f$	Flow detachment, tons
$G_r$	Total raindrop detachment, tons
$G_s$	Sediment supply capacity, tons
$G_t$	Sediment transport capacity, tons
$G_y$	Actual sediment yield for a storm, tons
$\bar{G}_y$	Mean annual sediment yield, tons
H	Head
$H_d$	Structure height, feet
I	Rainfall intensity, inches/hour
$K_a$	Flow rate per unit area, feet/second
$K_2$	Critical shear stress on sides/critical shear
$K'$	Weighted mean erodibility
$K_d$	Soil erodibility during dry season
$K_e$	Soil erodibility index
$K_f$	Retention parameter
$K_g$	Roughness coefficient
$K_w$	Soil erodibility during wet season
L	Length, feet
$L_a$	Length of the drop slope

LIST OF SYMBOLS (continued)

$L_b$  . . . . . Length of downstream apron  
 $L_d$  . . . . . Structure length, feet  
 $L_f$  . . . . . Rock outlet length, feet  
 $L_{max}$  . . . . . Maximum overland flow length, feet  
 $L_{min}$  . . . . . Minimum structure length, feet  
 $L_u$  . . . . . Length of upstream transition channel  
 $M_d$  . . . . . Number of dry months with erosive rainfall and/or snowmelt runoff  
 $M_w$  . . . . . Number of wet months with erosive rainfall and/or snowmelt runoff  
 $n$  . . . . . Mannings' roughness coefficient  
 $q$  . . . . . Unit overland flow discharge, cfs/foot/hour  
 $\Omega$  . . . . . Discharge runoff rate, cfs  
(Chapter IV, V)  
 $p$  . . . . . Decimal percent of a particular sediment size  
 $p_1$  . . . . . Silt (0.002-0.05 mm), decimal percent  
 $p_2$  . . . . . Very find sand (0.05-0.1 mm), decimal percent  
 $p_3$  . . . . . Fine, medium, coarse sand (0.1-1.0 mm), decimal percent  
 $p_4$  . . . . . Very coarse sand (1.0-2.0 mm), decimal percent  
 $p_f$  . . . . . Percentage of material finer than the critical size  
 $P$  . . . . . Rainfall, inches  
 $P_e$  . . . . . Rainfall excess, inches  
 $P_o$  . . . . . Initial abstraction, inches  
 $P_p$  . . . . . Total expected water yield, inches  
 $P_t$  . . . . . Total rainfall at 24 hours  
 $P_w$  . . . . . Mean annual water yield, inches  
 $R$  . . . . . Hydraulic radius, feet

LIST OF SYMBOLS (continued)

$R_p$  . . . . . Rainfall excess ratio  
 $S$  . . . . . Slope, decimal percent  
 $S$  . . . . . Maximum potential abstraction, inches (used only in Equations 4.2, 4.3, and 4.4)  
 $s_d$  . . . . . Spacing of dams  
 $s_x$  . . . . . Upland slope, decimal percent  
 $SS_{\text{after}}$  . . . Suspended solids value after filtration  
 $SS_{\text{bg}}$  . . . . Suspended solids value of background level  
 $t$  . . . . . Time, hours  
 $t_a$  . . . . . Thickness of the lining  
 $t_e$  . . . . . Duration of rainfall excess  
 $T$  . . . . . Topwidth, feet  
 $v$  . . . . . Velocity, fps  
 $v_c$  . . . . . Critical velocity, fps  
 $v_s$  . . . . . Deposited volume, cubic feet  
 $v_{sw}$  . . . . . Volume of sediment and water, cubic feet  
 $w$  . . . . . Fall velocity, feet/second  
 $w$  . . . . . Width, feet  
 $w_p$  . . . . . Weighting factor  
 $z$  . . . . . Side slope, horizontal unit per one vertical unit